

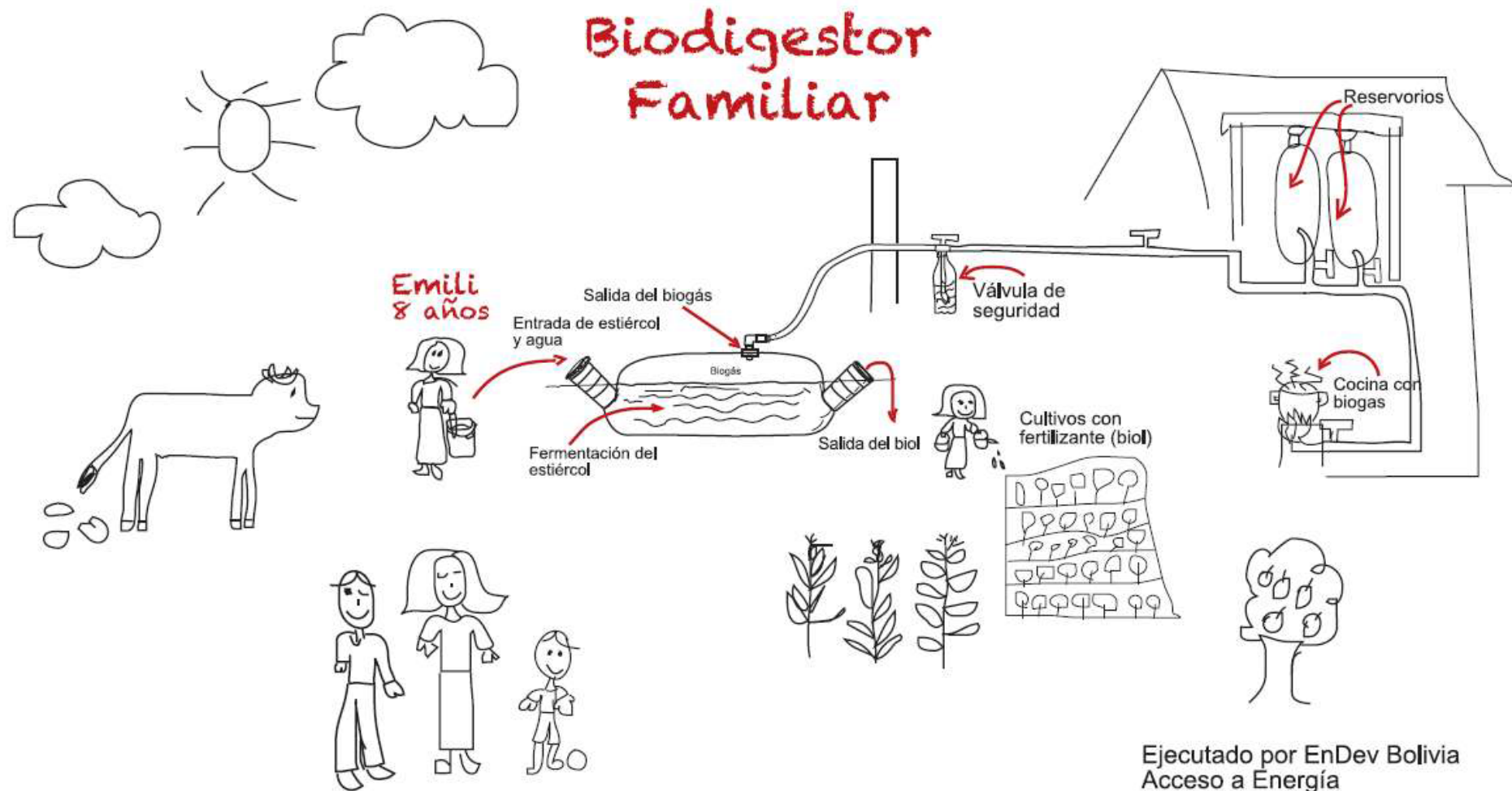
The influence of the end user's context on the dissemination of domestic biogas systems in developing countries

**Willington Ortiz, Julia Terrapon-
Pfaff and Carmen Dienst**

Innovating Energy Access for Remote Areas:
Discovering Untapped Resources

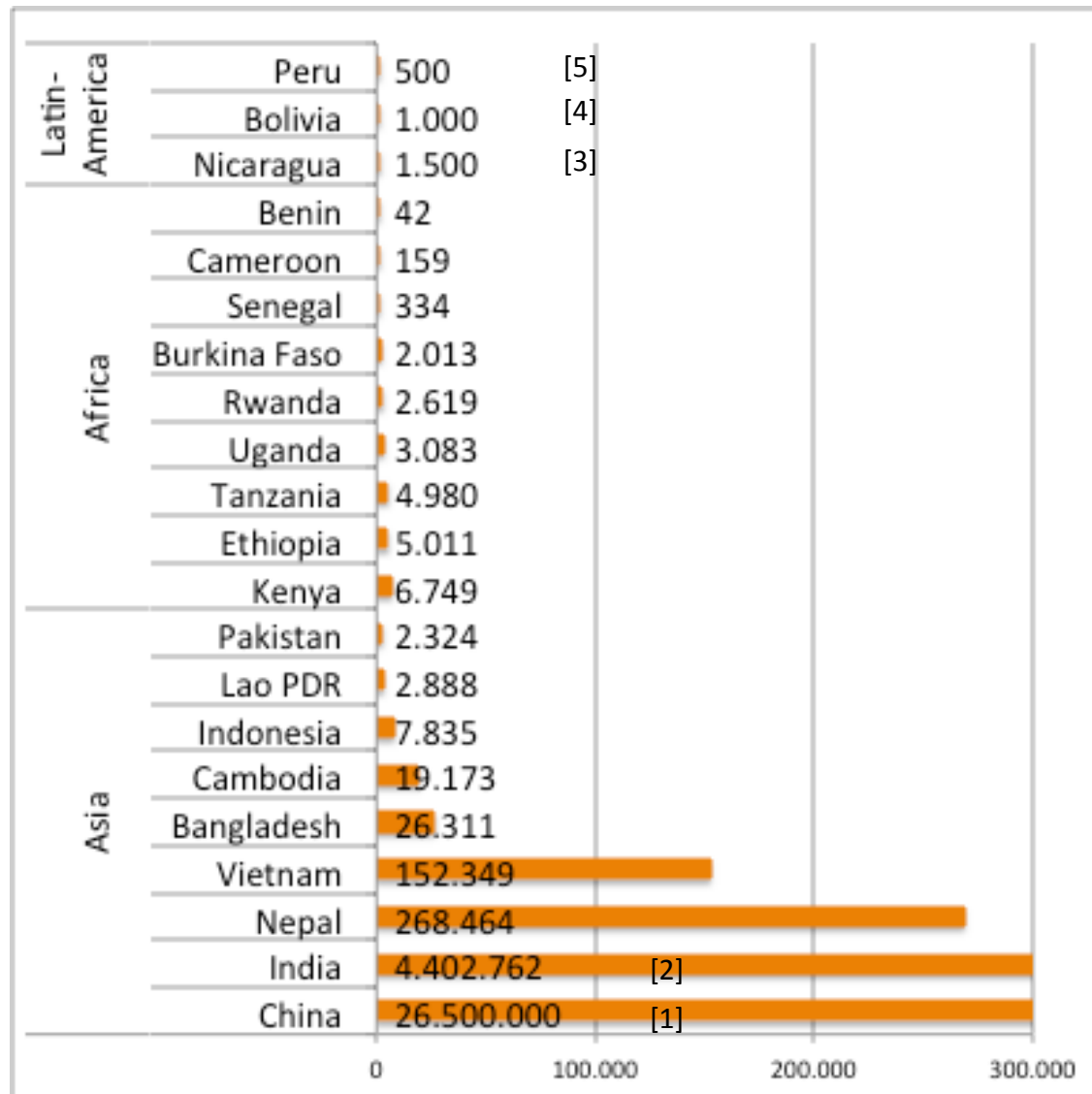
UC Berkeley, April 10 – 11, 2014

Domestic Biogas: Promising alternative for rural households (?)



Schematic view of a domestic biogas system from the EnDev-Bolivia program, drafted by Emili Serrano, 2009:
Joung adopter of biogas in Tiquipaya, Bolivia. Courtesy of Jaime Martí Herrero (<http://tallerbiogas.blogspot.com>)

Domestic Biogas: Promising alternative for rural households (?)



Cumulative installations of domestic biogas in selected countries by the end of 2012, according to SNV, 2013

Exceptions:

[1] Chen et al., 2010 (data for 2007)

[2] MNRE, 2014 (data for 2011)

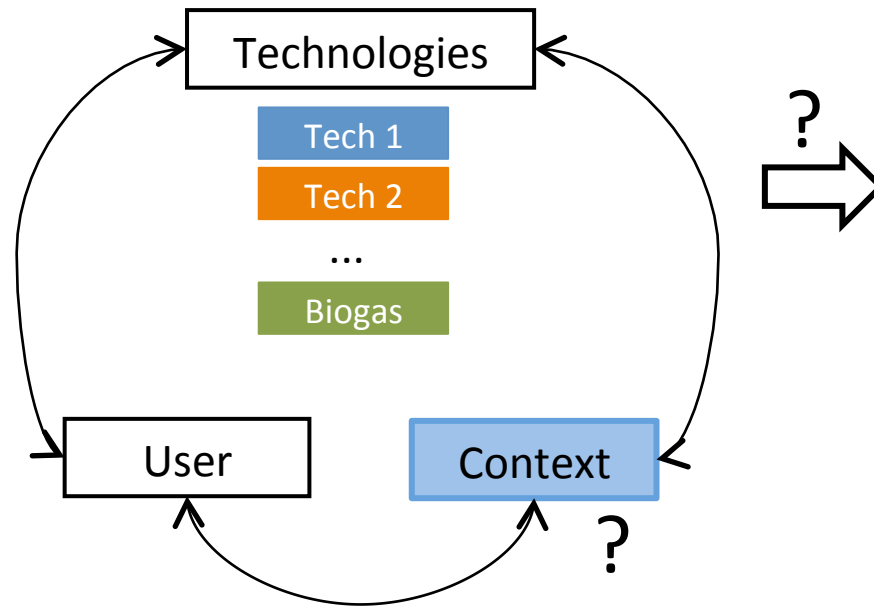
[3] SNV, 2010

[4] SNV, 2012a

[5] SNV, 2012b




Research objective

Which contextual factors influence the adoption and diffusion process of domestic biogas systems?

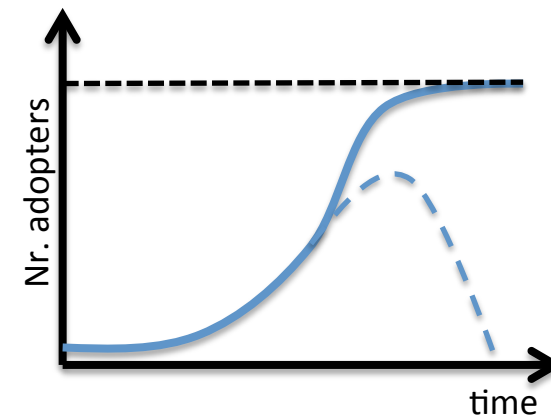


Schematic view of a system perspective to adoption and diffusion of domestic biogas. Based on Ruiz-Mercado et al. (2011)

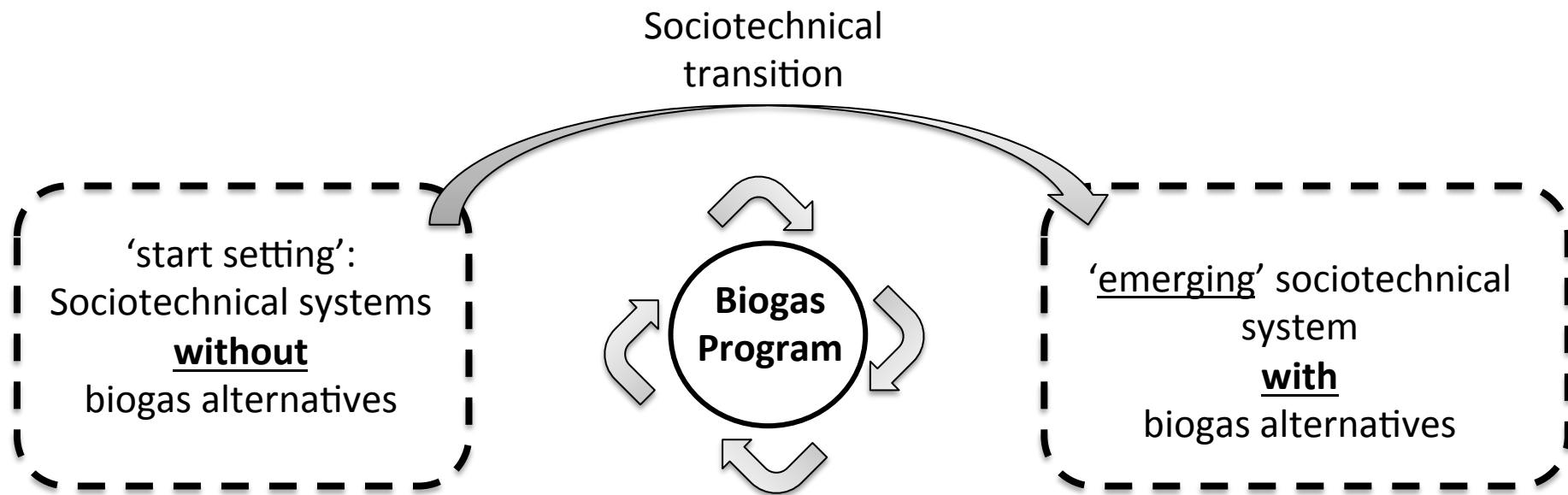
Adoption

cooking practice 1 
cooking practice 2 
cooking practice 3 
...

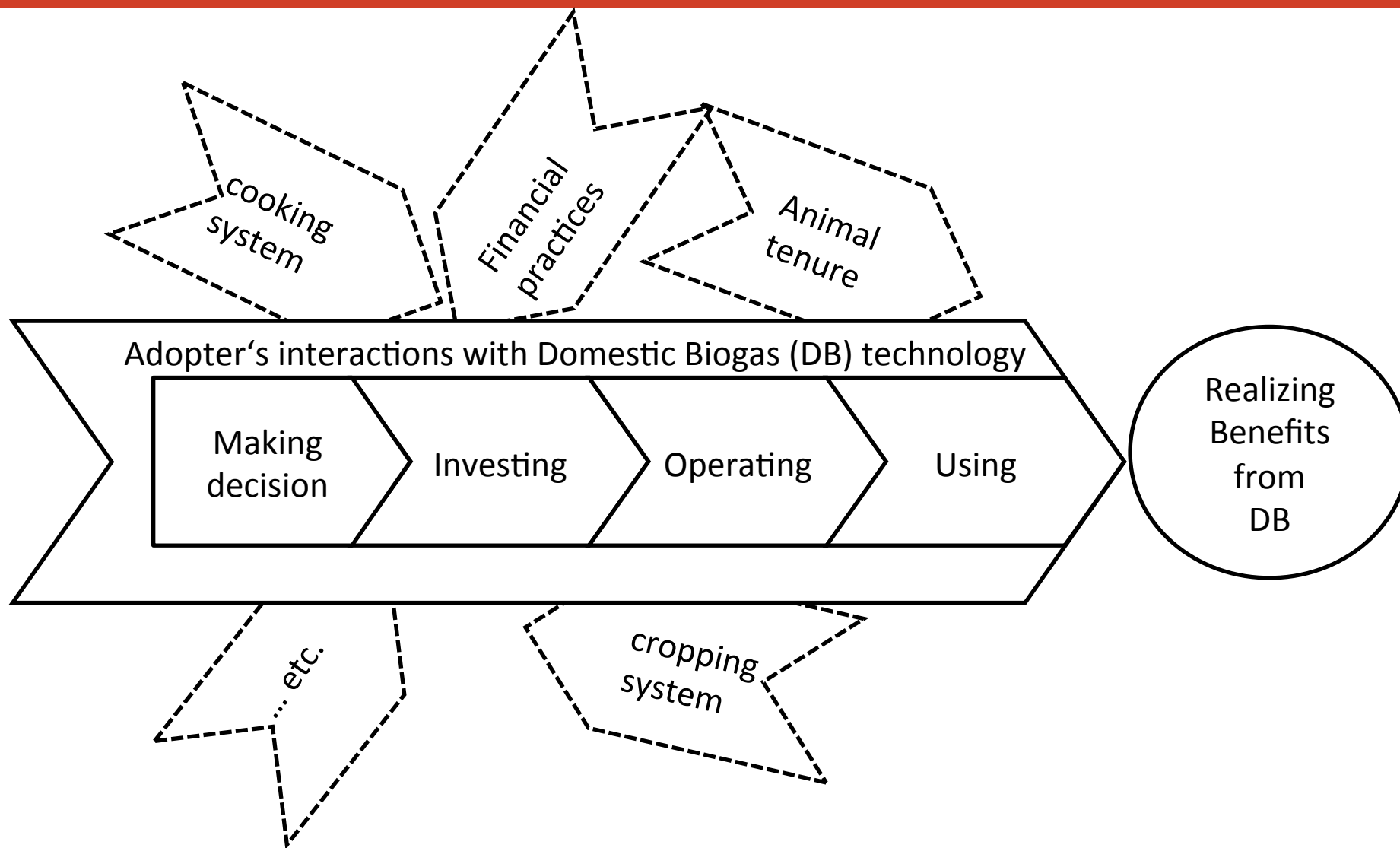
Diffusion



Analytical Approach

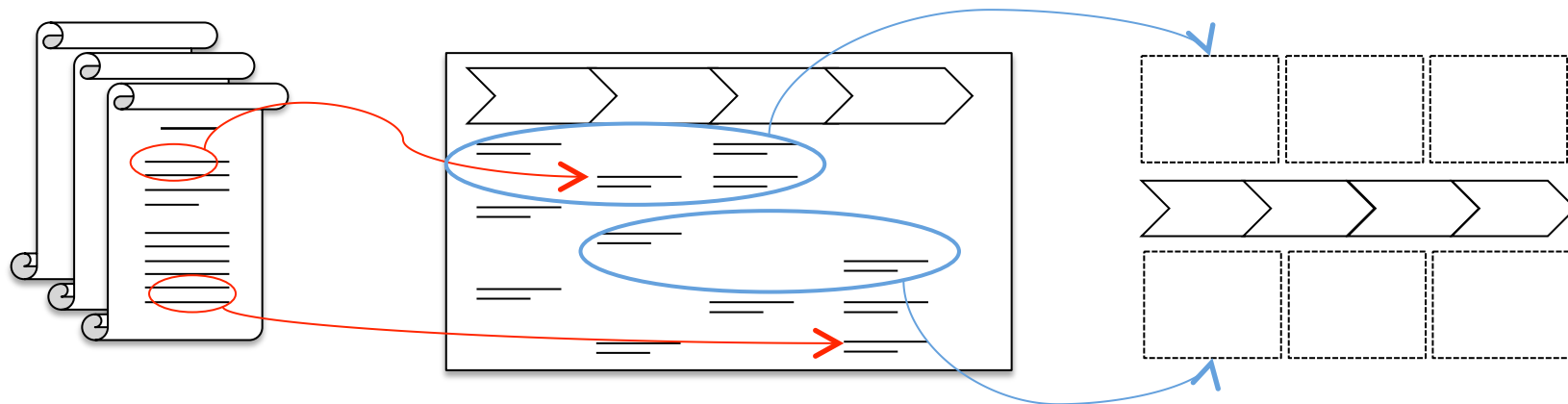


Analytical Approach



Methodology

- Content analysis of (14) peer reviewed Articles:
 - Diverse analytical approaches
 - But all analyzing real examples of dissemination initiatives/programs

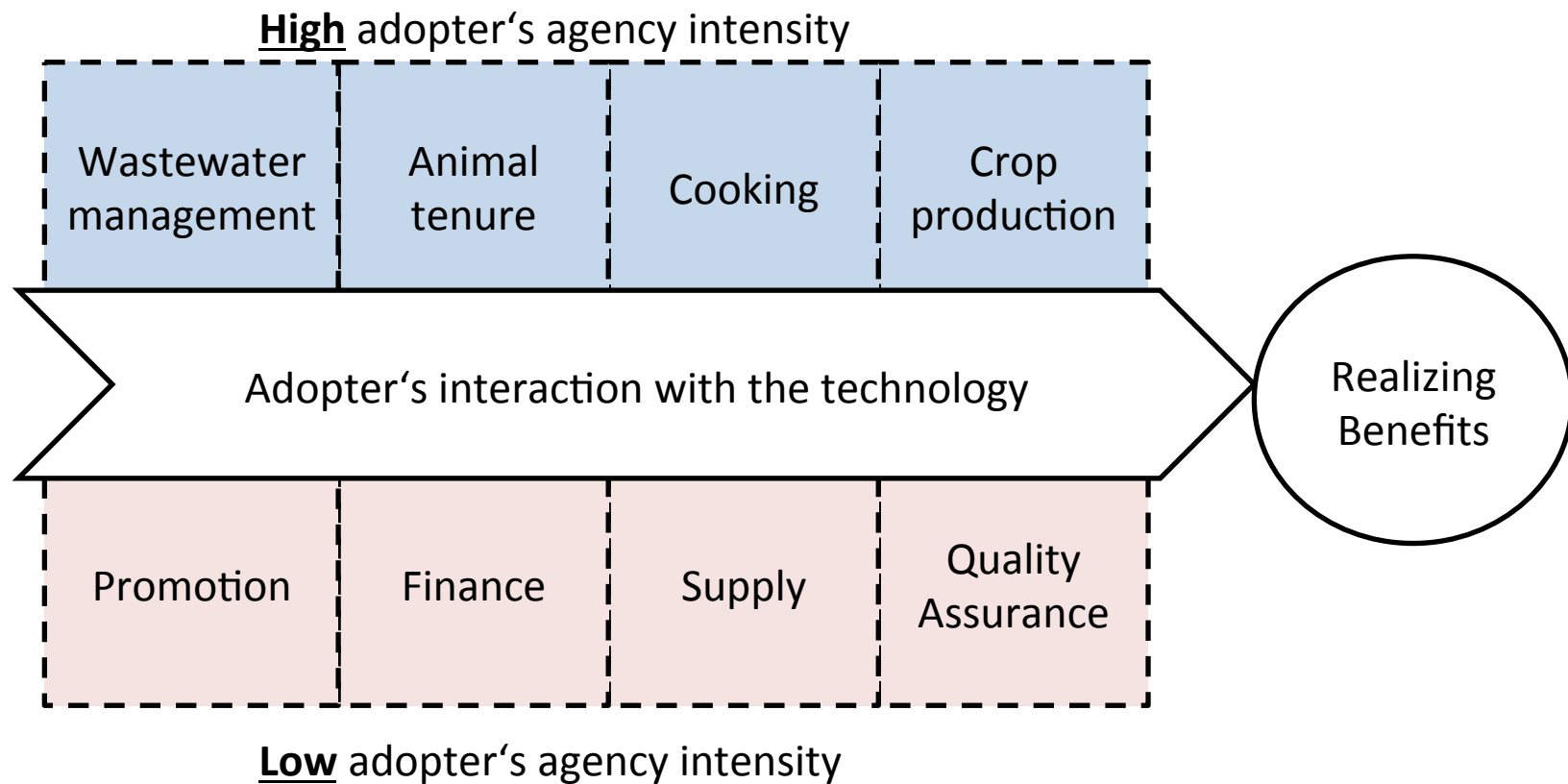


Extracting and mapping
influencing factors

Clustering factors in suitable
sociotechnical structures
(specific functions)

Findings

Sociotechnical structures influencing adoption and diffusion of domestic biogas technologies



Strong influencing structures at adopter's level: 'Animal tenure' and 'Crop production'

- Adjustments of material and practical components -> need for R&D in technical issues. E.g.:
 - Design/Adjustment of stables, channels, tools for collecting/treating/mixing manure.
 - Tools and techniques for pumping/storing/transporting/distributing effluents.
- High need for empirical knowledge. E.g.:
 - Nutritional value of effluents for common crops; application techniques (dosage, schedule, etc.)

Strong influencing structures beyond adopter's control: 'Financing' and 'Supply'

- Addressing affordability issue requires a 'financing system' comprising both components:
 - Subsidy for a fraction of capital costs
 - Adapted loan mechanisms.
- Development of 'supply system' central task of dissemination programs
 - several 'new components' has to be developed: Skilled personnel, institutions (e.g. regulations, standards, contracting practices), entrepreneurships, etc.
 - After-sale services should be part of its functions.

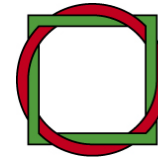
Broadening understanding of domestic biogas

- Domestic biogas is not (only) a cooking alternative.
- It is rather a technology that (can) reshapes several livelihood dimensions of rural households. More prominently:
 - animal tenure, cooking, crop production, wastewater management
- Generalizing the applicability of ‘successful’ lessons is still not possible
- The proposed framework of influencing sociotechnical configurations can help in evaluating the applicability of single strategies in different contexts.

Outlook

Further research topics

- Interactions with ‘non-for-cooking’ systems:
 - Which factors are most relevant for and which strategies are applied by dissemination programs to support adopters in ‘aligning’ biogas system with animal tenure, crop production and eventually sewage systems?
- Integration of domestic biogas in existing supply-systems of rural services/products
 - To which extent do/can domestic biogas programs use existing supply-systems?



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Many thanks for your attention



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References

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- Ruiz-Mercado, I., Masera, O., Zamora, H., Smith, K.R., 2011. Adoption and sustained use of improved cookstoves. *Energy Policy*, 39, 7557-7566
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Geographic distribution of analysed studies

Country	Studies
Cambodia	Buysman et Mol, 2013
China	Qu et al., 2013; Chen et al., 2012; Chen et al., 2010; van Groenendaal et Gehua, 2010
India	Bhat et al., 2001
Nepal	Cheng et al., 2014; Katuwal et Bohara, 2009
Peru	Garfí et al., 2012
Rwanda	Landi et al., 2013
Tanzania	Laramée et Davis, 2013; Mwakaje, 2008
Uganda	Walekhwa et al., 2009
Vietnam	Thu et al., 2012